



ADAMA

PITCHER®

Regie, met slagkracht



FUNGICIDE

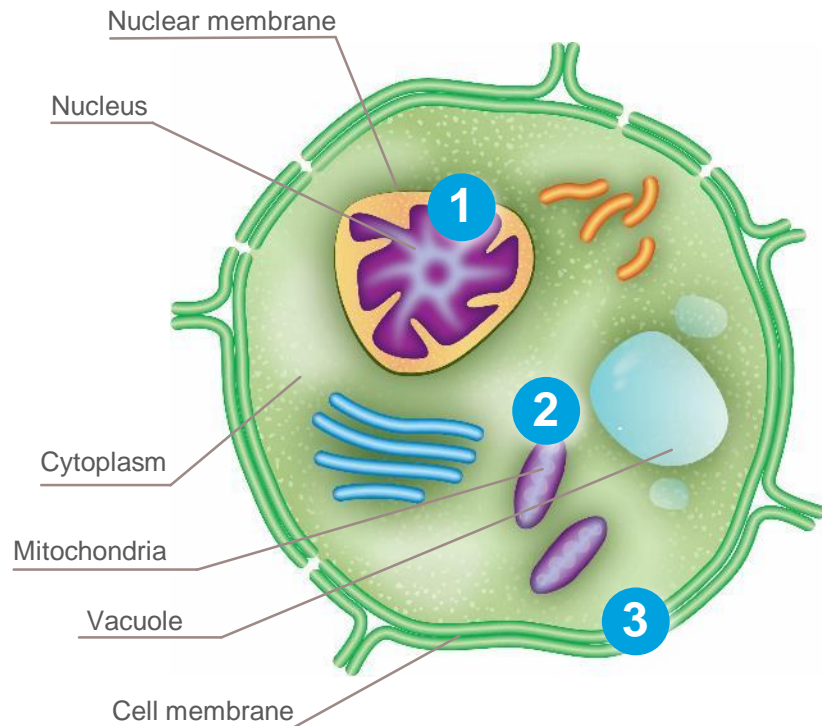
Voor boldompeling en
gewasbespuiting

7-stappen plan

om Fusarium onder controle te krijgen

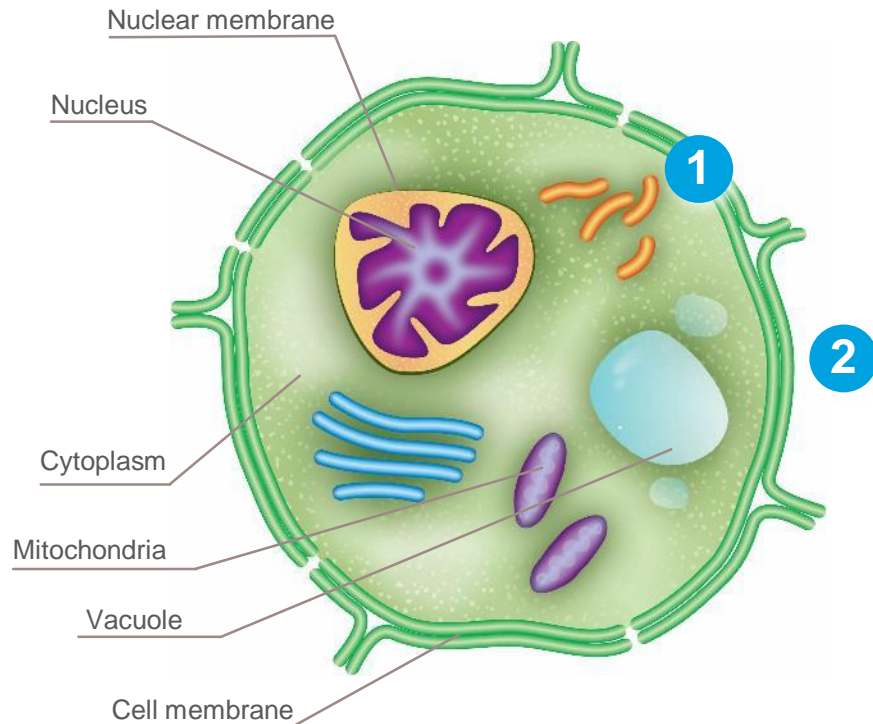


MULTI-SITE werking folpet



- 1** Werking op celkern → **Stopt celdeling**
- 2** Werking op mitochondria → **Stopt energieproductie**
- 3** Werkt op celmembraan → **Stopt celontwikkeling**

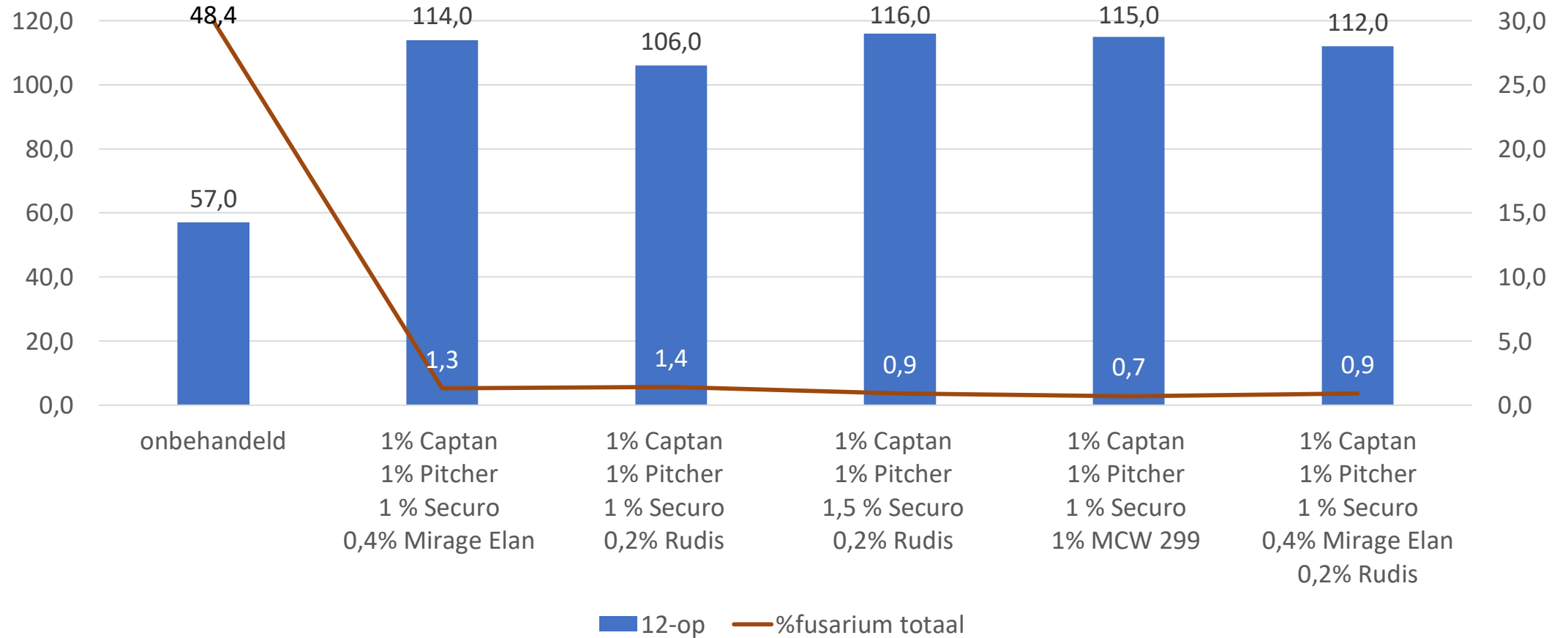
Werking fludioxonil



- 1 Werking op celmembraam → **Stopt celdeling**
- 2 Werking op celwand → **Stopt uitgroeï mycelium**

Dompelproef tulp

cultivar: 'Dow Jones', Zwaagdijk, 2022 (geïnfecteerd)
tweede beoordeling, eind augustus



FRAC Classification of Fungicides

Fungal control agents by cross resistance pattern and mode of action 2021 (www.frac.info)

A: Nucleic Acids Metabolism

A1: RNA polymerase I

4: 9A-fungicides (2-thienylamines)

Group 4

A2: adenosine deaminase

8: hydroxy (2-amino)pyrimidines

Group 8

A3: DNA / RNA synthesis (prop.)

32: heteroaromatics

Group 32

A4: DNA topoisomerase type II (gyrase)

31: carboxylic acids

Group 31

B: Cytoskeleton and Motor Proteins

B1: > β-tubulin assembly in mitosis

1: MIC fungicides
10: Methyl benzimidazole Carbamates

Group 1

B2: > β-tubulin assembly in mitosis

10: N phenyl carbamates

Group 10

B4: cell division (unknown site)

20: phenylfurans

Group 20

B3: > β-tubulin assembly in mitosis

22: benzamides and thiazole carboxamides

Group 22

B5: delocalisation of spectrin-like proteins

43: benzamides

Group 43

B6: actin/myosin/fimbrin function

47: cyanoacrylates
50: arylphenylketones

Group 47/50

C: Respiration

C1: complex I NADH Oxido-reductase

39: pyrimidinones, pyrazole-4-yl, quinazolinone

Group 39

C2: complex II: succinate-dehydrogenase

7: SDHI (Quinoline Dihydrogenase Inhibitors)

Group 7

C3: complex III cytochrome bc1 (ubiquinol oxidase) at Qo site (cyt b gene)

11: QoI fungicides (Quinone outside Inhibitors)

Group 11

C4: complex III cytochrome bc1 (ubiquinol oxidase) at Qi site

21: QiI fungicides (Quinone Inside Inhibitors)

Group 21

C5: uncouplers of oxidative phosphorylation

29

Group 29

C6: inhibitors of oxidative phosphorylation, ATP synthase

30: organo tin

Group 30

C7: ATP transport (proposed)

31: methylene carbamates

Group 31

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Group 31

D: Amino Acid and Protein Synthesis

D1: methionine biosynthesis (cys gene) (proposed)

9: Azolo Pyrimidines (AP fungicides)

Group 9

D2: protein synthesis (ribosome, initiation step)

23: enopyrrolone acid

Group 23

D3: protein synthesis (ribosome, initiation step)

24: hexopyranoyl antibiotics

Group 24

D4: protein synthesis (ribosome, initiation step)

25: glucopyranosyl antibiotics

Group 25

D5: protein synthesis (ribosome, elongation step)

41: tetraacyclic antibiotics

Group 41

E: Signal Transduction

E1: signal transduction (mechanism unknown)

13: azanaphthalenes

Group 13

E2: osmotic signal transduction

> MAP / histidine-kinase (os-2, HOG1)
12: phenylpyrroles (PP-fungicides)

Group 12

E3: osmotic signal transduction

> MAP / histidine-kinase (os-1, Daf1)
2: dicarboximides

Group 2

F: Lipid Synthesis or Transport / Membrane Integrity or Function

F2: phospholipid biosynthesis

> methyltransferase
6: phosphoribosylates & dibenzamides

Group 6

F3: cell peroxidation (prop.)

> aromatic hydrocarbons & heteroaromatics
14

Group 14

F4: cell membrane permeability, fatty acids (perm.)

28: carbamates

Group 28

F8: ergosterol binding

48: polyenes

Group 48

F9: lipid homeostasis and transfer/storage

49: OSCP Oxydized binding protein homologue inhibition

Group 49

I: Melanin Synthesis in Cell Wall

I1: reductase in melanin biosynthesis

16.1: galloyl glyoxylylase inhibitors, Reductases (MBI-1)

Group 16.1

I2: dehydratase in melanin biosynthesis

16.2: diene biosynthesis inhibitors, Dehydratases (MBI-2)

Group 16.2

I3: polyketide synthase in melanin biosynthesis

16.3: Melanin biosynthesis inhibitors, Polyketide synthase (MBI-3)

Group 16.3

G: Sterol Biosynthesis in Membranes

G1: C14-demethylase in sterol biosynthesis (erg11/cyp51)

3: DMF-fungicides (demethylase-inhibitors) (SBI - Class I)

Group 3

G2: Δ¹⁴-reductase and Δ¹⁴-Δ⁷-isomerase in sterol biosynthesis (erg2, erg24)

5: Anilino-Morpholines (SBI - Class II)

Group 5

G3: 3-keto reductase in C4-de-methylation (erg27)

17 (KR) fungicides, Keto-reductase inhibitors (SBI - Class III)

Group 17

G4: squalene epoxidase in sterol biosynthesis (erg7)

18 (SBI - Class IV)

Group 18

H: Cell Wall Biosynthesis

H4: chitin synthase

19: Polyenes

Group 19

H5: cellulose synthase

40: Carboxylic Acid Derivatives (CAA fungicides)

Group 40

Unknown Mode of Action

*Priority status, information on mode of action and/or resistance risk still uncertain

G17

Group G17

G18

Group G18

G19

Group G19

G20

Group G20

G21

Group G21

G22

Group G22

G23

Group G23

G24

Group G24

G25

Group G25

G26

Group G26

G27

Group G27

G28

Group G28

G29

Group G29

G30

Group G30

P: Host Plant Defence Induction

P1: salicylate related

#P03 benzothiazole SDHI

Group P01

P2: salicylate related

#P02 benzothiazole

Group P02

P3: salicylate related

#P03 thiazole-carboxamide

Group P03

P4: polysaccharide elicitors

#P04 polysaccharide

Group P04

P5: anthraquinone elicitors

#P05 plant extract

Group P05

P6: microbial elicitors

#P06 Bacteria, Bacillus spp.

Group P06

P7: phosphonates

#P07 phosphonates

Group P07

P8: salicylate related

#P08 salicylate

Group P08

BM: Biologicals with Multiple Modes of Action

BM 01: plant extract

Group BM01

BM 02: microbial (strains of living microbes or extract, metabolites)

Group BM02

M: Chemicals with Multi-Site Activity

M01

Group M01

M02

Group M02

M03

Group M03

M04

Group M04

M05

Group M05

M06

Group M06

M07

Group M07

M08

Group M08

M09

Group M09

M10

Group M10

M11

Group M11

M12

Group M12

M13

Group M13

M14

Group M14

M15

Group M15

M16

Group M16

M17

Group M17

M18

Group M18

M19

Group M19

M20

Group M20



Dank voor jullie aandacht



ADAMA

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